

# Decentralized Wastewater Solutions for a Historic Mill Village

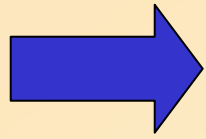
Massachusetts Stream Flow Conference  
Tyngsboro, MA April 29, 2005



Lorraine Joubert, Nonpoint Education for Municipal Officials  
University of Rhode Island, Cooperative Extension  
Tel: 401-874-2138    [Ljoubert@uri.edu](mailto:Ljoubert@uri.edu)



# Topics



**Decentralized systems as a tool to meet land use & resource management goals.**

**Chepachet Village project and other examples**

**Summary and resources available.**



## **Typical conditions in historical village centers**

- Outdated and failed septic systems
- Impaired river quality.
- High water table and stormwater runoff
- Densely clustered, small lots, by rivers & wetlands.
- Drinking water from local wells.

# **Wastewater Treatment Options**

1. Sewer 2. Conventional repairs 3. Decentralized systems.

---

## **Option 1 - Sewers**

- Often unavailable**
- Loss of recharge from onsite systems.**
- Loss of groundwater through infiltration as sewer lines age and leak.**
- Difficult to control development with pressure to rezone. Increased runoff, change in village character.**



## Option 2 - Repair Conventional Septic Systems



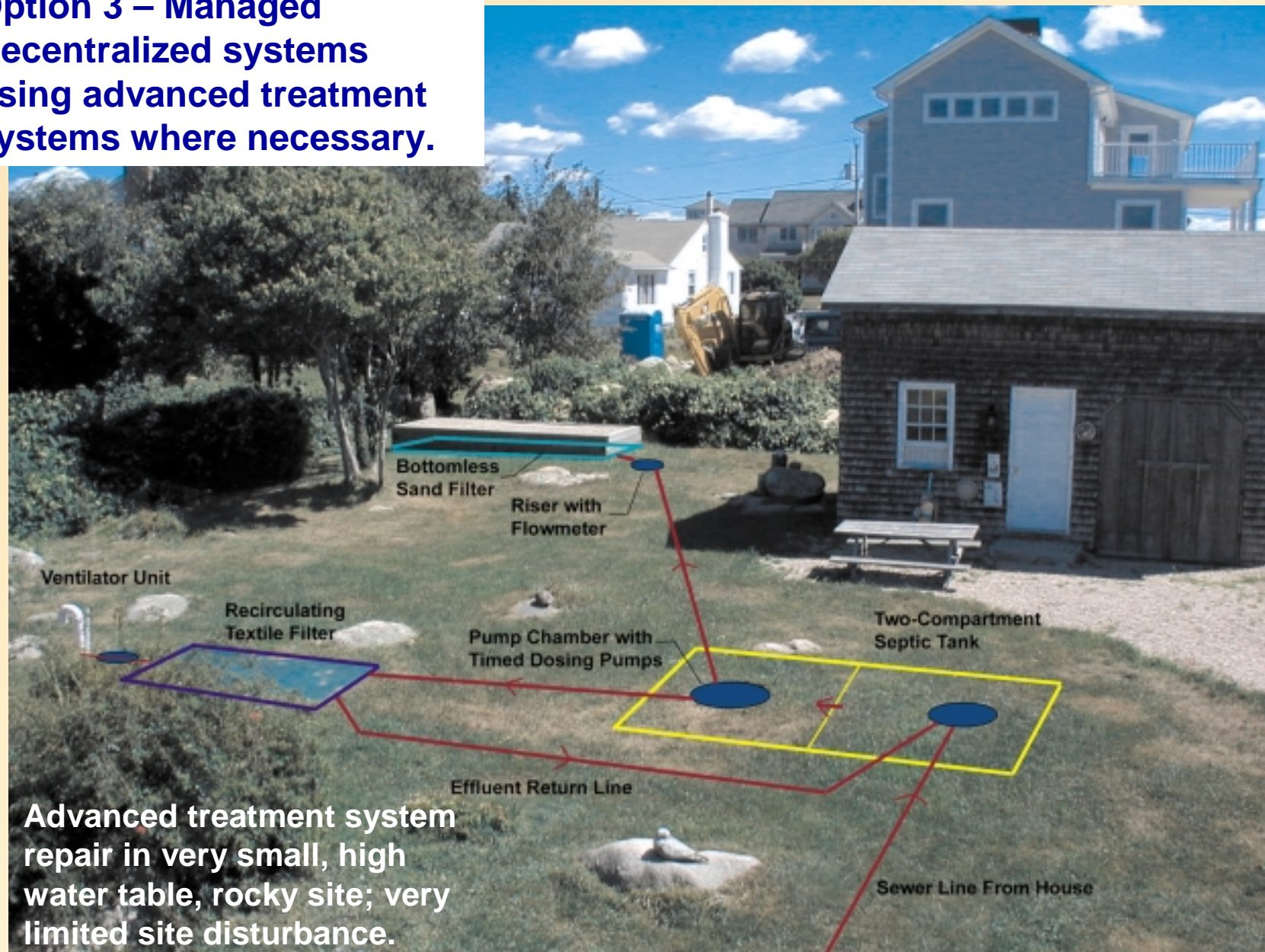
Raised “fill” or “mound” system – a modification of a conventional system for marginal sites.

**Conventional septic system repair using a “raised fill system.**

- **Alters look of neighborhood, diverts runoff, and can be costly.**
- **Little protection for nearby wells.**



**Option 3 – Managed  
Decentralized systems  
using advanced treatment  
systems where necessary.**



**Advanced treatment system  
repair in very small, high  
water table, rocky site; very  
limited site disturbance.**

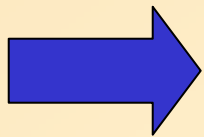


Conventional “fill” systems used for new construction on high water table, MA. Driveways are at original grade.

Won't advanced treatment  
system open up marginal land  
for development?

# Topics

Decentralized systems as a tool to meet land use & resource management goals.



**Chepachet Village project and other examples**

Summary and resources available.





Circa 1840

## Chepachet Village Wastewater Demonstration Project Gloucester, Rhode Island

Funded by Town of Gloucester and RI Department of  
Environmental Management, Section 319 Nonpoint Program



## **Town concerns**

- Eliminate direct discharges to river and failing systems.
- Protect groundwater aquifers and water supply wells.
- Rely on onsite systems – sewers unavailable.
- Control stormwater runoff and localized flooding.
- Support continued revitalization of main street business district with limited future growth, consistent with existing character.



## URI Project components

- Short term remediation using demonstration systems as repairs – 5 demonstration systems installed.
- Village wastewater needs assessment— evaluate pollution risks and onsite treatment options.





## **Multifamily Cluster system repair**

**900 gpd system serving 3  
structures**

- historic society building**
- 2 bedroom home**
- Apartment building  
with six units**

- Each structure has a  
septic tank and gravity  
collection in common  
recirculation tank**







3

Textile filter  
with  
Bottomless  
sand filter  
drainfield



**2,700 gpd system serves:**

**Neighborhood restaurant,  
Duplex apartment, Physician's  
office, and five-unit strip mall.**



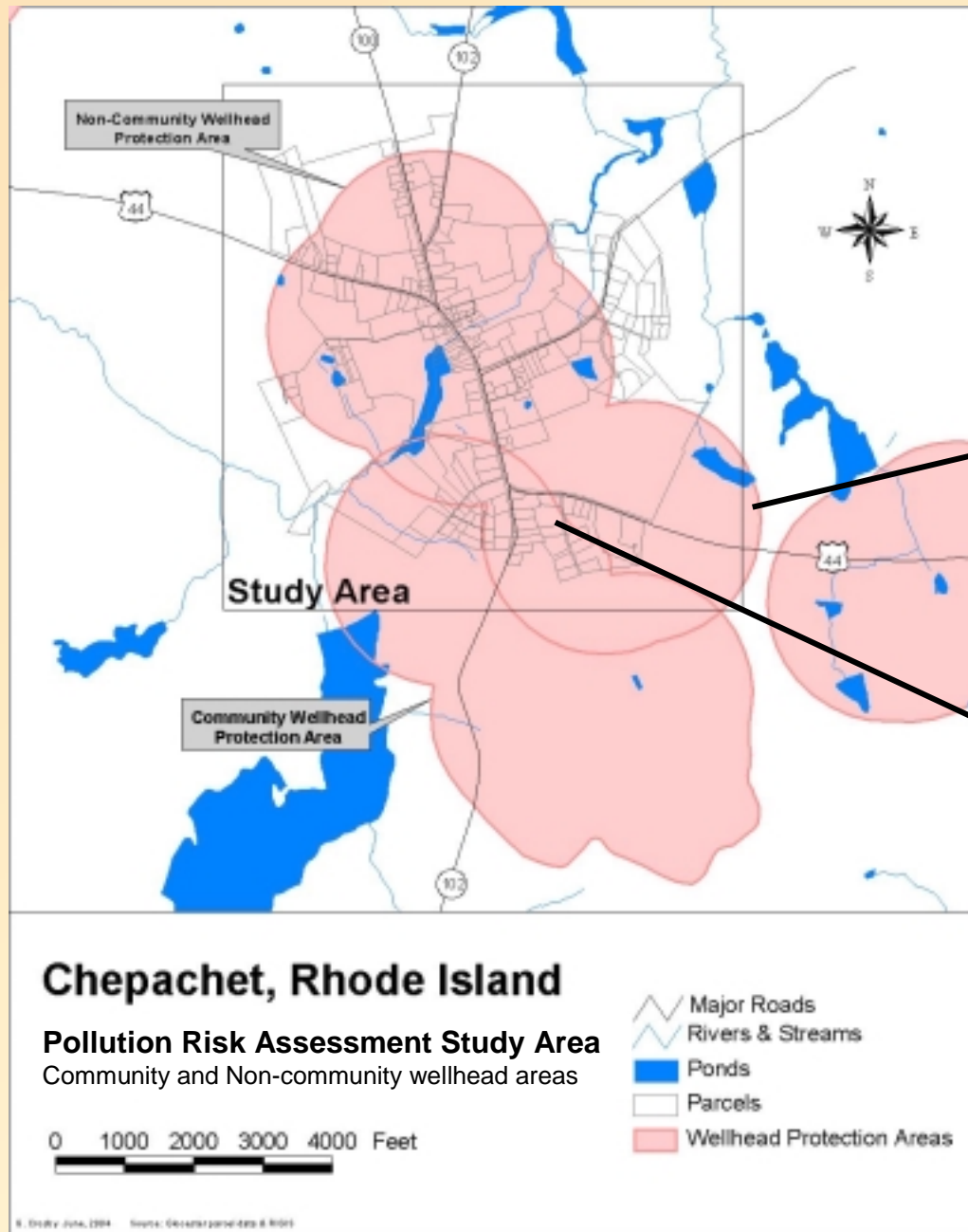
**Shallow narrow drainfield in parking island that is planted to grass**

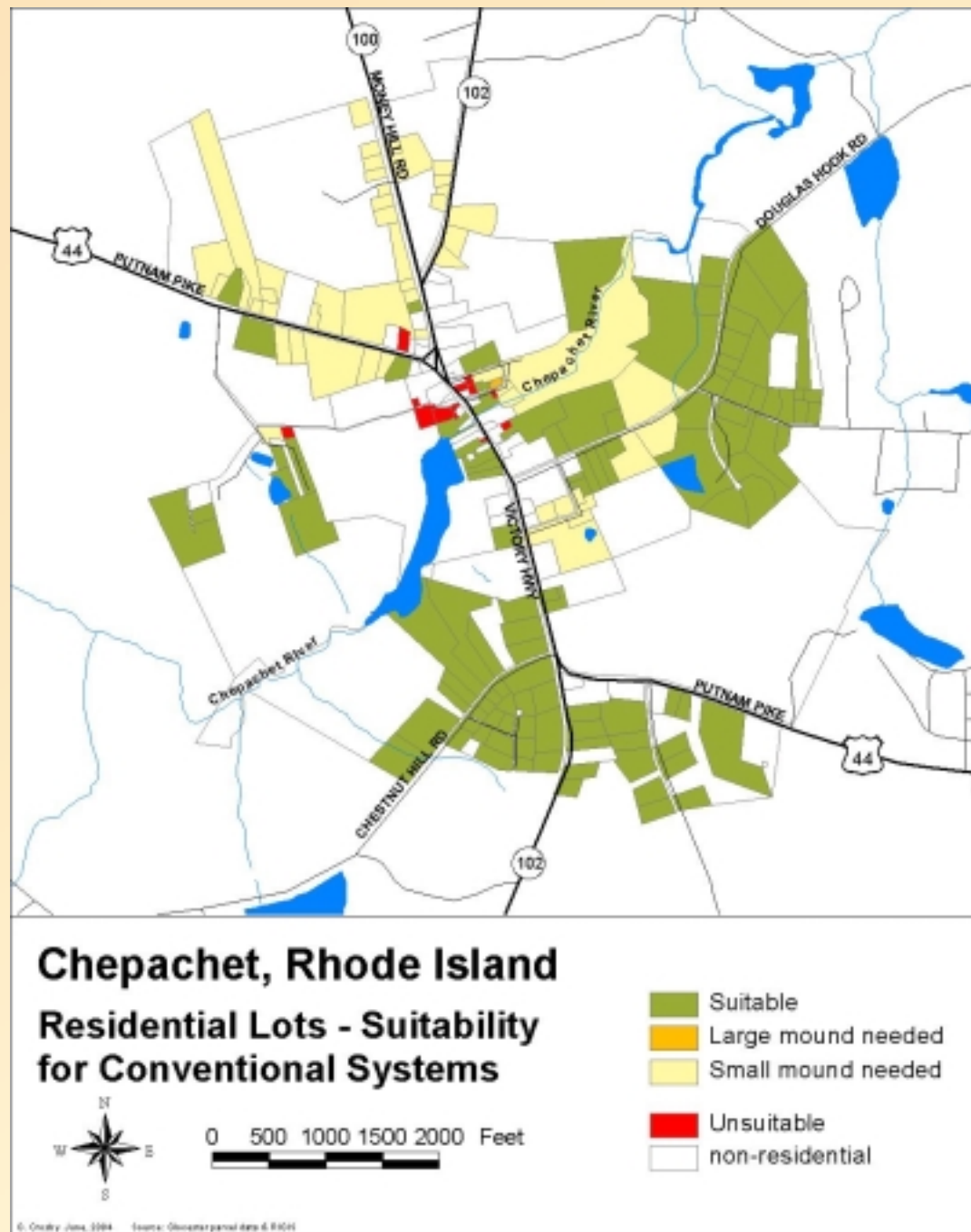


# GIS Wastewater Needs Assessment Objectives

1. Identify Pollution  
Risks to wellhead area

2. Evaluate suitability for  
onsite wastewater  
treatment in village center.

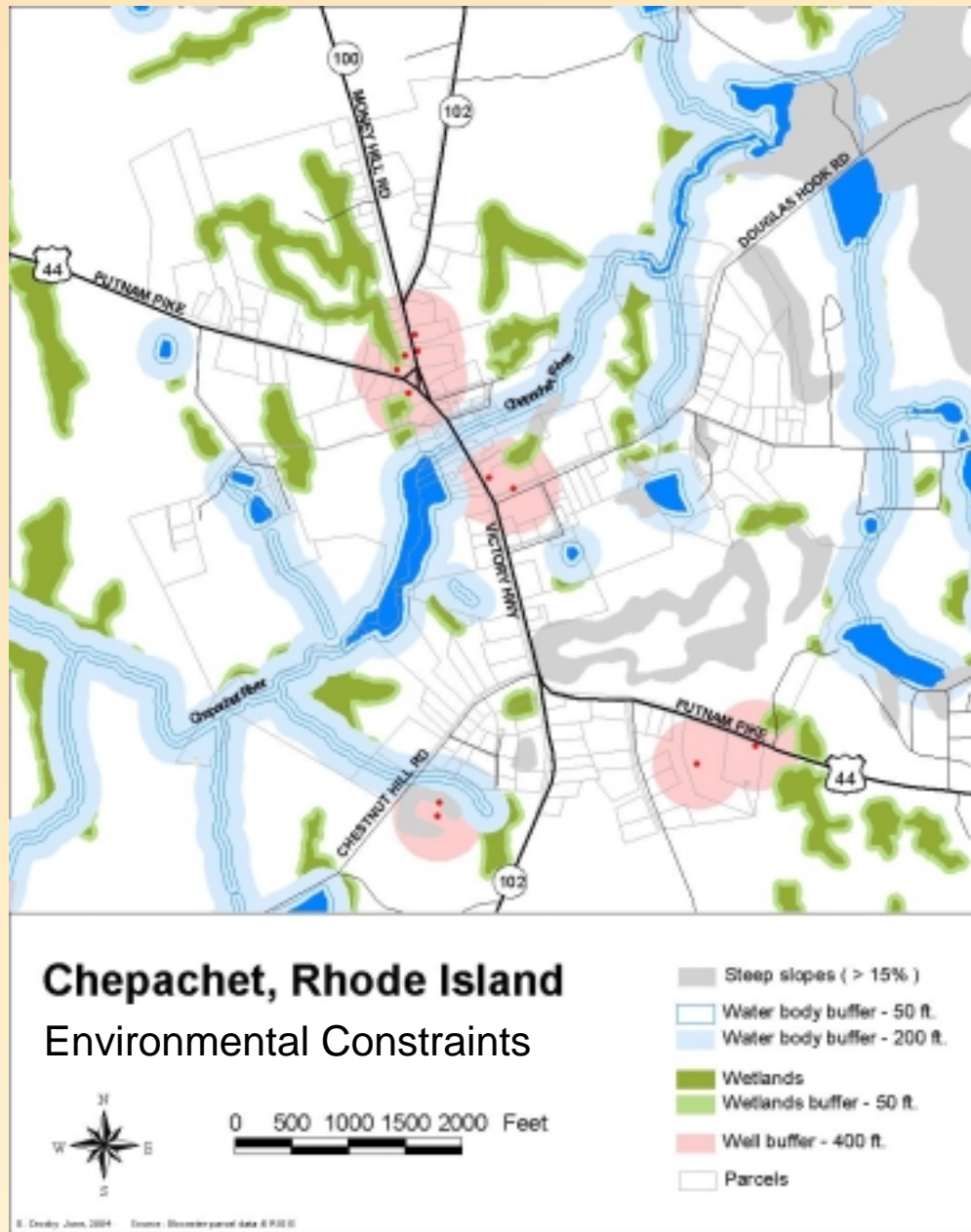




## **Tier 1. Potential suitability for leachfield function based on lot size and soils**

**Results for residential lots:**

- 60% suitable
- 30% marginal with small mound
- 10% unsuitable



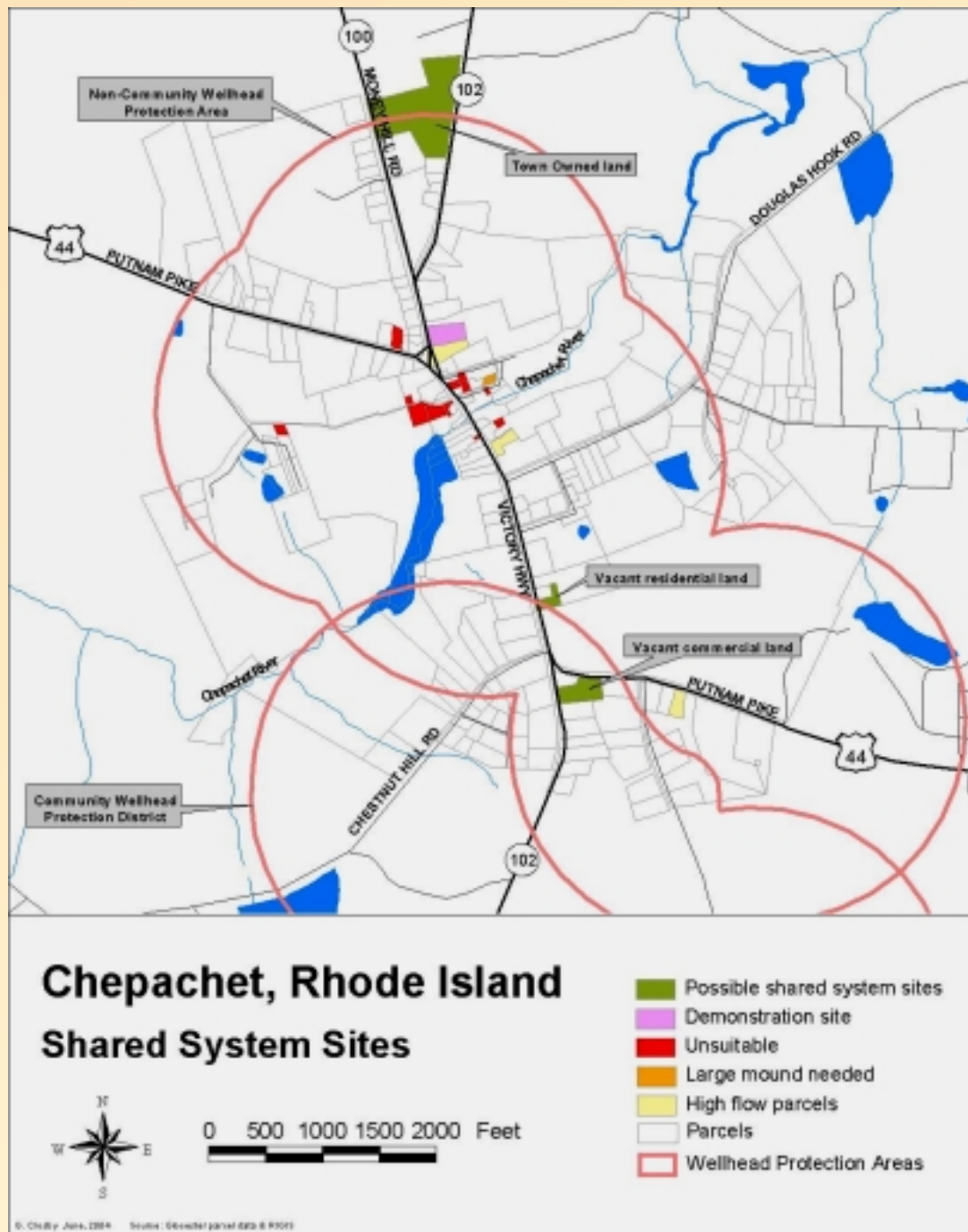
**Tier 2. Evaluate environmental constraints.**

**Consider buffers to public wells, wetlands and waterbodies.**

**Results for residential lots:**

- 35% suitable
- 16% marginal –with small mound
- 39% poorly suited due to environmental constraints
- 10% unsuitable





Potential locations for cluster systems were identified based on suitable soils, vacant, or town owned land.

Field investigation is necessary.

## Example onsite solution – Wickford RI



**Advanced treatment unit in basement of above historical building serves retail at street level and multi-family above, and eliminates direct discharge to coastal waters.**

**Bottomless sand filter provides at-grade drainfield in alley between buildings.**



## ***Supporting village and rural case studies taken from actual projects***

## **New Village Style Development**



*Layout of the Donovan's Farm Conservation Development. The forty homes in the development are gathered along an old-fashioned village street.*

**Land use:** Town of Norwell MA bought a 175-acre estate to preserve historic farmstead; 40 acres developed for senior housing, remainder preserved as open space.

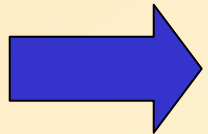
**Wastewater treatment:** Wastewater pumping to a sequencing batch reactor. Drainfield in town green.



# Topics

Decentralized systems as a tool to meet land use & resource management goals.

Chepachet Village project and other examples



**Summary and resources available.**

# The 3 most important factors when using alternative systems



Maintenance  
Maintenance  
Maintenance!

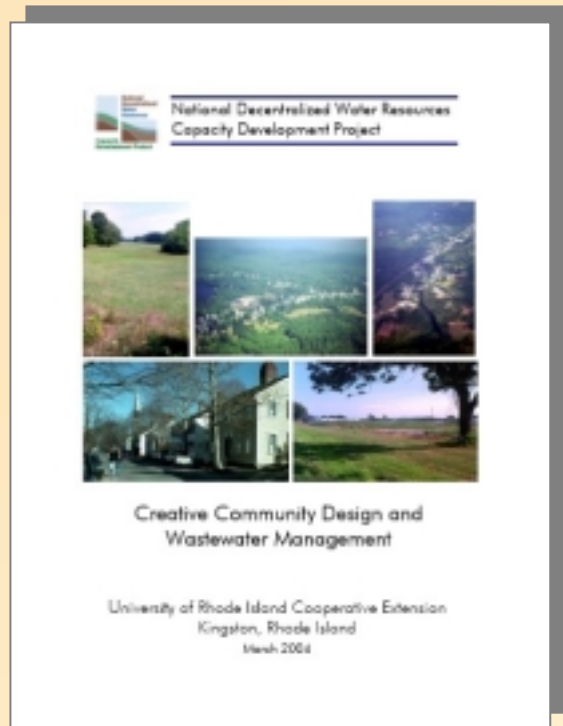
# Foundation for Community Wastewater Management in RI

- Municipal enabling legislation for Wastewater Management Districts (1987) and zoning
- Standard Inspection Procedure –RI Septic system Checkup.
- RIDEM Technical Review Committee approves new technologies.
- RIDEM Community Grants for wastewater planning.
- Community Septic System loans using RI revolving funds now 2% interest rate.
- URI Research, demonstration systems and training through Onsite Training Center.
- RIDEM licensing and certification for system designers and inspectors.

# *Resources*

## **Creative Community Design and Wastewater Management**

**[www.ndwrcdp.org/  
publications.cfm](http://www.ndwrcdp.org/publications.cfm)**



**Funded by the National Decentralized Water  
Resources Capacity Development Project**





### Choosing a Wastewater Treatment System



Part One of a Series About Onsite W

## NEW! 3-volume set on Wastewater Treatment Systems

[www.uri.edu/ce/wq/mtp/html/publications.html](http://www.uri.edu/ce/wq/mtp/html/publications.html)

### Alternative Wastewater Treatment for Individual Lots



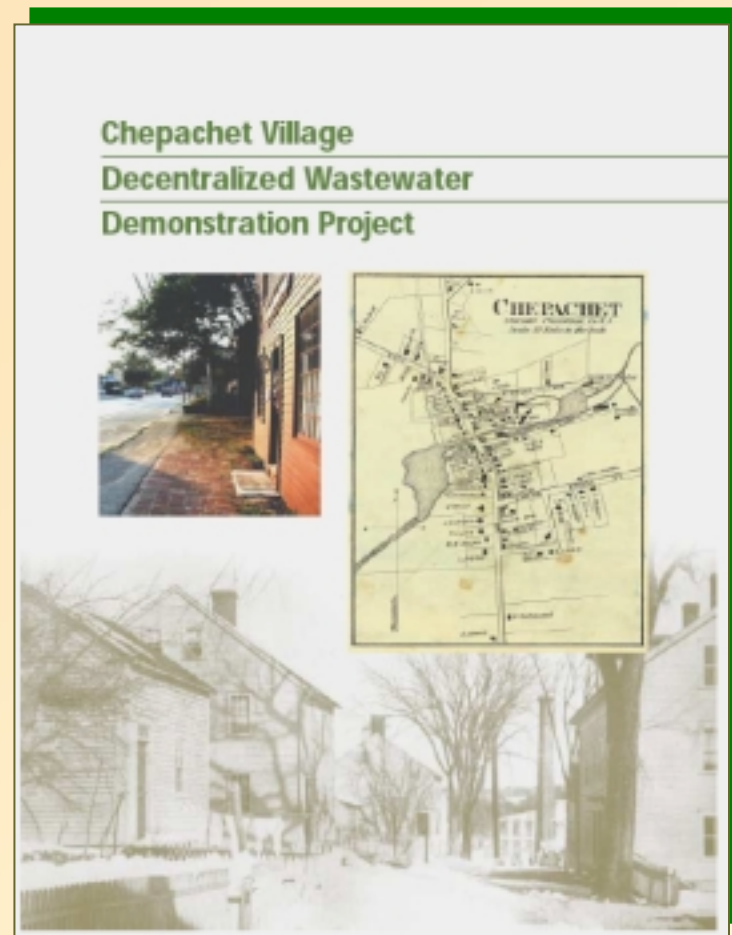
Part Two of a Series About Onsite Wastewater Trea

*Condensed from Creative  
Community Design and  
Wastewater Management*

### A Creative Combination: Merging Alternative Wastewater Treatment with Smart Growth



Part Three of a Series About Onsite Wastewater Treatment Alternatives



This presentation is based on the Chepachet Village Decentralized Wastewater Demonstration Project, prepared by:

Lorraine Joubert, URI Nonpoint Education for Municipal Officials and

George Loomis, URI Onsite Wastewater Training Center

URI Cooperative Extension  
Natural Resource Science Department  
Kingston, RI

Available at  
[www.uri.edu/ce/wq/mtp/html/publications.html](http://www.uri.edu/ce/wq/mtp/html/publications.html)

Thanks to the town of Glocester, Rhode Island and the Rhode Island Department of Environmental Management, Nonpoint Pollution "319" Program for funding this project.



## Resources on the Web now

Block Island/GreenHill  
Watershed Demonstration  
Project

<http://www.uri.edu/ce/wq/>

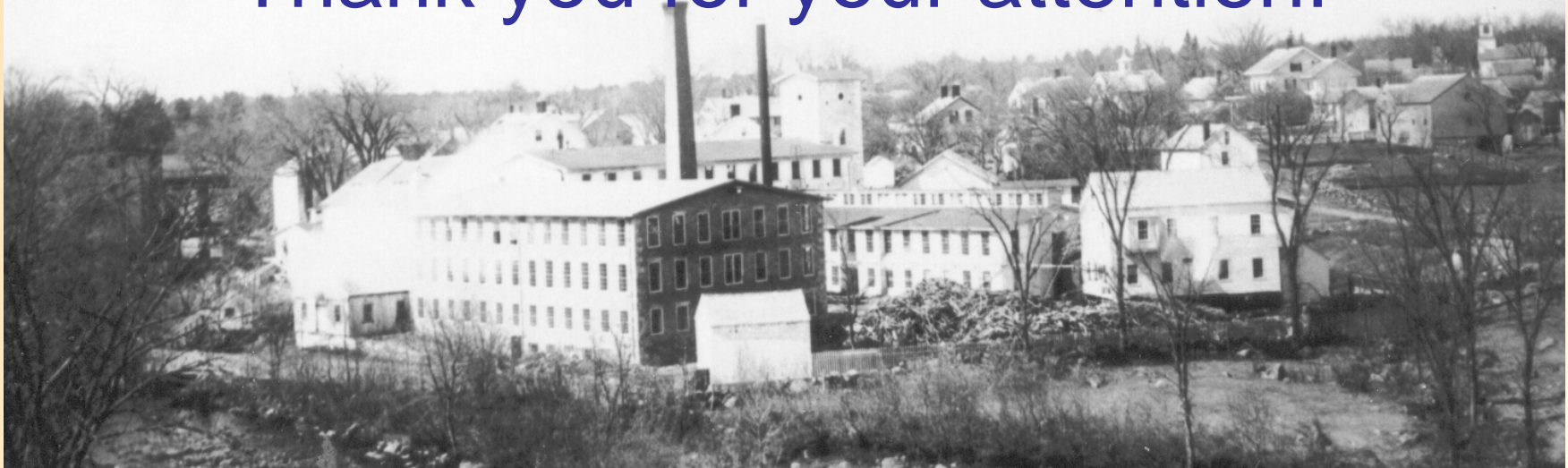


*Plans, ordinances, fact sheets, posters,  
workshop schedule, and much more*

# SAFEWATER

*A community effort to protect, recycle and sustain  
local water resources*

Thank you for your attention!



<http://www.uri.edu/ce/wq/>

***Contacts:***

Lorraine Joubert	401-874-2138	ljoubert@uri.edu
George Loomis	401-864-4558	gloomis@uri.edu
University of Rhode Island		
Cooperative Extension		
Natural Resources Science, Coastal Institute in Kingston		
1 Greenhouse Road, Kingston, RI 02881		